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Scientific Areas of Integrated Review Groups (IRGs)

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Respiratory Sciences IRG [RES]

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- [Lung Cellular, Molecular, And Immunobiology \[LCMI\]](#)
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Lung Cellular, Molecular, And Immunobiology [LCMI]

[\[LCMI Roster\]](#)

The Lung Cellular, Molecular, and Immunobiology [LCMI] Study Section reviews grant applications designed to study the genetic, molecular, and cellular basis of normal respiratory biology, and development, and the alterations in these processes in inflammatory and immune lung disorders. The study section will consider applications using molecules, cells, tissues, organs, animal models, and/or human investigations that address the identity, function, and products of the cells that populate the upper and lower airways and alveolar regions, the regulation and dysregulation of innate host defense mechanisms and the adaptive immune system in health and disease as they relate to the respiratory system. Topics may include the inflammatory and immune mechanisms that contribute to the pathogenesis of a variety of airway and alveolar diseases of the lung, including, but not limited to, asthma, Chronic Obstructive Pulmonary Disease, and cystic fibrosis.

Specific areas covered by LCMI:

- Cellular and molecular mechanisms in the normal lung. This includes examinations of lung cell biology in relationship to localization, phenotype expression, secretory products, and effector profile of cells in the lung. Examples of appropriate cells include airway epithelium, alveolar epithelium, airway smooth muscle, dendritic cells, fibroblasts, myofibroblasts, other mesenchymal cells, alveolar macrophages, leukocytes, mast cells, basophils, and goblet cells and glands.
- Basic cellular and molecular mechanisms involved in respiratory system development and pattern formation including topics such as genetic control, growth factors, and signaling mechanisms.

- Genetics and gene expression studies in normal and inflamed lung, including gene identification, expression, function, genotype-phenotype relationships, and gene- environment interactions.
- Regulation and dysfunction of adaptive/acquired, humoral and mucosal immunity in the normal and diseased lung.
- Regulation and dysfunction of innate immunity/host defense in the normal and diseased lung. Examples include airway antimicrobials, mucociliary clearance, macrophage, dendritic cells, mucins, surfactant, toll and other pattern-recognition receptor biology.
- Lung and airway immune responses to infectious agents (e.g., virus, bacteria, and fungus) that can contribute to the pathogenesis, progression or exacerbation of asthma, COPD, and Cystic Fibrosis.
- The pathogenesis and consequences of different types of pulmonary inflammation. Examples include the roles of mediators, cytokines, and gaseous molecules and their receptors/targets in disease processes and mechanisms of cell trafficking, including cell adhesion, chemotaxis, and cell migration and interactions between airway nervous system and immune cells and their products.
- Mechanisms of asthma pathogenesis, including immune and inflammatory mechanisms, mucosal immunity, airway hyper-responsiveness, pulmonary responses to allergens, role of innate immunity, biology of inflammation, and the biology of pulmonary infections.
- Mechanisms of COPD pathogenesis, including study of inflammation, mucus metaplasia, cytokine and mediator networks, leukocyte biology, contributions of infection, alterations in the innate and adaptive immune responses, protease - antiprotease balance, contributions of apoptosis, altered secretory processes, altered epithelial permeability and function, and angiogenesis.
- Mechanisms of the pathogenesis of Cystic Fibrosis in the lung, including genetics, modifier genes, genotype-phenotype relationships, development, ion transport, epithelial function, mucociliary clearance, mucus biology, inflammation, infection, and innate host defense mechanisms.
- Application of lung transplantation to the therapy of pulmonary diseases. Acute and chronic changes in respiratory system function that result from lung transplantation.
- Mechanisms of lung dysfunction in genetic disorders of lung defense, including surfactant deficiencies and ciliary disorders.
- Development of strategies for cell-based therapies in the lung, including gene therapy, cell transplantation approaches, dendritic cell modification, and modification of cytokine, mediator, and adhesion molecule systems.

LCMI has the following shared interests within the RES IRG:

- **With the Lung Injury, Repair and Remodeling [LIRR] Study Section:**

- o Basic mechanisms and immunobiology of asthma should be considered by LCMI, whereas occupational asthma and airway disease can be assigned to LIRR. Studies that include repair and remodeling in asthma and COPD may be assigned according to the central interests of the application.
- o Applications that focus on the basic biology of the innate immune system in the lung would be assigned to the LCMI. Studies addressing functions of innate immune system in the setting of infectious disease where the infection is the key issue would be assigned to LIRR. The role of infection in asthma, COPD, or CF would also be assigned to LCMI.
- o Mediator/cytokine studies may be assigned to the three study sections in the IRG based on their disease focus.
- o There is a shared interest between LCMI and LIRR concerning fibroblasts, myofibroblasts, leukocytes, and epithelial cells. Studies of these cells primarily focusing on lung injury, repair, and remodeling should be assigned to LIRR. Studies of basic ontogeny and biological properties of these cells should be assigned to LCMI.

- **With the Respiratory Integrative Biology and Translational Research [RIBT] Study Section:**

- o Applications focusing on basic cell biology of airway smooth muscle, when normal and abnormal mechanical issues are a major focus, can be assigned to RIBT. If immune function, proliferation, etc., of airway smooth muscle is the focus, applications can be assigned to LCMI.
- o Studies relating to cell and immune-based therapies will be assigned to LCMI if they involve modeling systems, humans or are developmental in nature. Small-scale “proof of concept” studies in humans can also be assigned to LCMI. Larger studies evaluating efficacy, for example, would be assigned to RIBT.
- o Studies of genetic and gene expression issues involving gene identification, expression, and function in cells, animal systems, and small human cohorts can be assigned to all three study sections in the IRG as per the disease focus. Investigations using large cohorts with fine mapping would be assigned to RIBT.
- o Studies of basic cell biology of pulmonary vascular cells (endothelial and vascular smooth muscle cells) may be assigned to RIBT. Pulmonary angiogenesis applications could be assigned to the LCMI if the focus is on asthma, COPD, and related disorders. Studies of pulmonary angiogenesis in its own right would be assigned to RIBT, if lung-relevant.
- o LCMI has shared interest with both LIRR and RIBT in their consideration of lung development. The control and integrated aspects of lung development, as well as development of the pulmonary vasculature, are most appropriate for consideration by RIBT. More cellular and molecular studies (LCMI) or responses to lung injury (LIRR) would be more appropriate for assignment to these other study sections.

LCMI has the following shared interests outside the RES IRG:

- **With the Biological Chemistry and Macromolecular Biophysics [BCMB] IRG:** Studies of molecules where the focus is on pulmonary function may be assigned to LCMI, whereas those developing methods or using these molecules simply as reagents may be assigned to the BCMB IRG. In general, studies of pulmonary tissue structure and function that use primarily biophysical techniques (e.g., X-ray diffraction, electron spin resonance, and single molecular techniques) could also be assigned to the BCMB IRG.
- **With the Cell Biology [CB] IRG:** Studies using molecular and cellular approaches to evaluate functions specific to the pulmonary system could be assigned to LCMI. Alternatively, studies using approaches to derive more general knowledge of cell function that use pulmonary tissue as a convenient source of material could be assigned to the CB IRG.
- **With the Genes, Genomes & Genetics [GGG] IRG:** Studies focusing on genetic and genomic approaches to identification and characterization of genes involved in respiratory system function could be assigned to LCMI. If the studies propose to use genetic and genomic approaches to identify and characterize such genes but the major focus is outside of the respiratory system, then the GGG IRG could be the appropriate assignment. Studies of quantitative genetics, genetic epidemiology and genetic analysis of complex traits, and genetically engineered animals with an emphasis on genetics rather than pulmonary biology may be assigned to the GGG IRG.
- **With the Biology of Development and Aging [BDA] IRG:** Applications that focus on development (such as fundamental studies of cell cycle control, apoptosis, cell fate, or early primordial pattern formation) would be assigned to the BDA IRG. In general, when the question being addressed is germane to the development of more than a single organ system, either because it addresses the "primordial organ" or because of the generality of the process being studied, the application would also be assigned to the BDA IRG. On the other hand, studies focused on the differentiation and development of the pulmonary system would be assigned to LCMI.
- **With the Bioengineering Sciences and Technologies [BST] IRG:** Studies of the use of the respiratory system as a platform for gene delivery for non-pulmonary diseases may be assigned to the BST IRG. Application of gene delivery technologies when it is specific for inherited and acquired lung disorders may be more appropriate for LCMI or LIRR. Development of novel technologies may also be assigned to the BST IRG.
- **With the Immunology [IMM] IRG:** Applications focusing on inflammation, innate immunology, and autoimmune diseases of the lung might be assigned to LCMI. Applications dealing with mechanisms of allergy and biologic responses to allergens insofar as they affect the lungs and respiratory tract may be assigned to LCMI. Applications that focus on the role of the immune system in allergy and the immune system’s response to allergens may be assigned to the IMM IRG. Lung transplant applications, where the focus is on transplant immunology, could be

assigned to the IMM IRG, whereas those related to pathobiology of organ function could be assigned to LCMI. Applications on basic, pre-clinical, and clinical investigations involving the etiology, initiation, immunopathophysiology, prevention and treatment of diseases in which the immune system plays a major role, may be assigned to the IMM IRG.

- **With the Infectious Diseases and Microbiology [IDM] IRG:** Shared interest in host defense and microbial pathogenesis. The respiratory system has several innate host defense mechanisms that protect against pathogens. Studies of these systems, both their normal mechanisms and their dysfunction, and their interaction with microorganisms are appropriate for LCMI. Investigations of the response to the infectious agent as it affects structure and function of the lung are also appropriate. Studies focused on the microorganisms per se and generic host defense mechanisms may be assigned to the IDM IRG.
- **With the Hematology [HEME] IRG:** Assignment of applications on the trans-differentiation of stem cells from blood stem cells to pulmonary cell types, and vice versa, would be resolved in the direction of the final phenotype.
- **With the Endocrinology, Metabolism, Nutrition and Reproductive Sciences [EMNR] IRG:** There is shared interest with areas related to fetal and neonatal pulmonary development, physiology and pathophysiology. Applications that directly relate to cellular and molecular aspects of pulmonary development and function (e.g., fetal and neonatal lung cellular development and disease) could be assigned to LCMI. Applications dealing with endocrine, metabolic, nutritional, or reproductive effects (pregnancy and fetal and neonatal well-being) on fetal and neonatal pulmonary physiology and pathophysiology could be assigned to the EMNR IRG.
- **With the Surgical Sciences, Biomedical Imaging and Bioengineering [SBIB] IRG:** There is significant shared interest with the SBIB IRG. Areas such as surgical interventions to treat pulmonary dysfunctions or diseases may be assigned to the SBIB IRG. The responses of the pulmonary system to trauma, surgery, or other physiologic stress may be assigned to LCMI.

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Lung Injury, Repair, and Remodeling [LIRR]

[\[LIRR Roster\]](#)

The Lung Injury, Repair, and Remodeling [LIRR] Study Section reviews applications that focus on the mechanisms of lung injury, repair, and remodeling in non-vascular pulmonary tissue or cells. The scope of the studies to be reviewed by LIRR includes genetic susceptibility, molecular biology, cell culture, tissue, organ and animal models, and human investigations. Among the mechanistic processes considered are cellular processes including signal transduction, control of gene expression, cell cycle/cell death mediators, normal and abnormal function of pulmonary cell populations (including leukocytes), proteolytic mechanisms, and receptors. Integrative processes include inflammation, cell trafficking, host defense, injury caused by reactive oxygen and nitrogen species and by hypoxia, cell-cell interactions, regulation of extracellular matrix, lung metabolism (xenobiotic bioactivation and drug detoxification), effects of particles and gases on lung cells, and effects of blood components such as coagulation factors and complement.

Specific areas covered by LIRR:

- Environmental and occupational lung diseases and inhalation and respiratory toxicology.
- Lung injury, including acute lung injury, acute respiratory distress syndrome, and ventilator-induced lung injury. This would include studies addressing airway and alveolar epithelial injury; leukocyte contributions to lung injury, normal and abnormal lung permeability; surfactant and secretions, and mechanisms of resolution, repair, and remodeling, including angiogenesis.
- Pleural diseases, including infections, dysplasias, hyperplasias and other non-malignant proliferative disorders, and inflammatory processes.
- Neonatal and pediatric lung diseases including hyaline membrane disease, meconium aspiration syndromes, pneumonia, and chronic lung disease and studies of lung development which are directly relevant to neonatal and pediatric lung diseases.
- Fibrosis and interstitial lung diseases, including granulomatous diseases (such as sarcoidosis), idiopathic pulmonary fibrosis, interstitial pneumonias, autoimmune lung diseases, and lymphangioleiomyomatosis.

- Respiratory infections and host defense, including pneumonia and airway infections caused by viruses, bacteria, fungi, mycobacteria.
- Lung fluid balance including epithelial (ion channels, aquaporins, etc.), interstitium, and lymphatic function and pulmonary edema, when not primarily restricted to the pulmonary vasculature.

LIRR has the following shared interests within the RES IRG:

- **With Lung Cellular, Molecular and Immunobiology [LCMI]:**LCMI and LIRR have shared interests in immunity, inflammation, injury, repair and remodeling, which may include studies on asthma and COPD. Basic mechanisms of innate or adaptive immunity should be reviewed by LCMI, while respiratory responses to infection will be considered by LIRR. Basic mechanisms and immunobiology of asthma should be considered by LCMI, whereas occupational asthma can be reviewed by LIRR. Inflammation in non-vascular, pulmonary tissue, as it is involved with lung injury, repair and remodeling, should be referred to LIRR. Studies of lung secretions relevant to acute lung injury and repair should be reviewed by LIRR. Studies that include repair and remodeling or infections in asthma and COPD may be assigned according to the central interests of the application. There is also a shared interest between LCMI and LIRR concerning fibroblasts, myofibroblasts, leukocytes, and epithelial cells. Studies of these cells relating to lung injury, repair, and remodeling should be reviewed by LIRR. Angiogenesis, when part of lung injury or lung repair, would be considered by LIRR. Mediator/cytokine studies may be assigned to the three study sections in the IRG based on their disease focus.
- **With Respiratory Integrative Biology and Translational Research [RIBT]:** In general, clinical studies involving interventions for respiratory disease should be reviewed by RIBT. Complications of COPD involving the chest wall and respiratory muscle mechanics should be assigned to RIBT. Diagnosis and assessment of disability of all lung diseases should be assigned to RIBT. Physiologic studies of the airways and lung mechanics should go to RIBT. Applications focused on the coordinated development of the multiple systems that make up the respiratory complex in normal and pathological states will be considered by RIBT, while studies of lung development directly relating to neonatal and pediatric lung diseases and lung injury should be assigned to LIRR. In general, studies of normal and abnormal pulmonary cell vascular biology, and of the bronchial circulation, may be referred to RIBT, unless the studies also have a large non-vascular component, in which case LIRR is more appropriate. Included in this rubric would be studies involving coagulation factors and complement. Lung inflammation, when pulmonary vascular tissue is primarily involved, would be reviewed by RIBT; studies of inflammation primarily involving non-vascular tissues may be referred to LIRR. Basic studies related to particle deposition and distribution will be reviewed by RIBT, whereas such investigations, when directly related to pulmonary injury of non-vascular tissues, would be considered by LIRR.

LIRR has the following shared interests outside the RES IRG:

- **With the Cell Biology [CB] IRG:** There is shared interest in cell functions and interactions. In general, studies related to cell function and interactions in respiratory injury, repair, and remodeling would be assigned to LIRR. Other studies in which the respiratory system is not the principal focus could be assigned to the CB IRG.
- **With the Genes, Genomes & Genetics [GGG] IRG:** There is shared interest in the regulation of gene expression and fundamental genetics. Studies related to gene expression in respiratory injury, repair, and remodeling may be assigned to LIRR. If the studies propose to use genetic and genomic approaches to identify and characterize genes, but the major focus is outside of the respiratory system, then the GGG IRG could be the appropriate assignment. Studies of quantitative genetics, genetic epidemiology and genetic analysis of complex traits, and genetically engineered animals with an emphasis on genetics rather than pulmonary biology may be assigned to the GGG IRG.
- **With the Biology of Development and Aging [BDA] IRG:** Applications that focus on development (such as fundamental studies of cell cycle control, apoptosis, cell fate, or early primordial pattern formation) would be assigned to the BDA IRG. In general, when the question being addressed is germane to the development of more than a single organ system, either because it addresses the "primordial organ" or because of the generality of the process being studied, the application would also be assigned to the BDA IRG. Studies related to development and aging as they impact on respiratory injury, repair, and remodeling may be assigned to.
- **With the Bioengineering Sciences and Technologies [BST] IRG:** Studies of the use of the respiratory system as a platform for gene delivery for non-pulmonary diseases may be assigned to the BST IRG. Application of gene delivery technologies when it is specific for inherited and acquired lung disorders may be more appropriate for LCMI or LIRR. Development of novel technologies may also be assigned to the BST IRG.
- **With the Immunology [IMM] IRG:** There is shared interest in autoimmune and inflammatory diseases. In general, studies of multi-systemic diseases with incidental involvement of the lungs would be assigned to the IMM IRG, while applications focusing on the respiratory system would be assigned to LIRR.
- **With the Infectious Diseases and Microbiology [IDM] IRG:** There is shared interest in host defense and microbial pathogenesis. Studies of infection and host defense would in general be assigned to LIRR if it results in lung disease. Studies of basic mechanisms of host defense and microbial pathogenesis would be assigned to the IDM IRG. Applications focusing on pulmonary injury as a result of exposure to a bio-terrorist agent could be assigned to LIRR. If the respiratory system is the portal of entry for such agents, assignment to LIRR may also be considered.
- **With the AIDS and Related Research [AARR] IRG:** There is shared interest in HIV and opportunistic infections associated with HIV. The AARR IRG should review applications where the lung is involved in pathophysiologic responses to HIV or subject to opportunistic infections associated with HIV. Other opportunistic infections may be appropriately assigned to LIRR.
- **With the Oncological Sciences [ONC] IRG:** There is shared interest in the pathogenesis of lung cancer. In general, studies of diagnosis, prevention, treatment, and epidemiology of lung cancer would be assigned to the ONC IRG. Applications focusing on dysplasia and hyperplasia derived from environmental or occupational lung exposure should be considered by LIRR.
- **With the Hematology [HEME] IRG:** There is shared interest in cell trafficking. Studies focusing on cell migration in and through the lungs may be assigned to LIRR. Other studies in which the respiratory system is not the principal focus would be assigned to the HEME IRG.

- **With the Endocrinology, Metabolism, Nutrition and Reproductive Sciences [EMNR] IRG:** There is shared interest in fetal and neonatal lung responses to injury. Fetal and neonatal lung diseases and disorders may be assigned to LIRR except when they relate to the maintenance of pregnancy or fetal well-being, in which case the application may be assigned to the EMNR IRG.
- **With the Digestive Sciences [DIG] IRG:** There is shared interest in the disposition (absorption, metabolism, distribution, and excretion) of chemicals, including xenobiotics such as pro-drugs and drugs, biopharmaceutical agents, and other non-drug chemicals, and the study of their mechanisms of action (both pharmacological and toxicological) in normal and pathological conditions. Studies that address the effects of digestive system-generated metabolites of xenobiotics or the absorption and excretion of xenobiotics by the digestive system may be assigned to the DIG IRG. Applications that address the metabolism and disposition of xenobiotics in the lung may be assigned to LIRR. Environmental and occupational lung diseases (including interstitial lung diseases and asthma induced by environmental agents) and inhalation and respiratory toxicology, including the effects of particles and gases on lung cells, may also be assigned to LIRR.
- **With the Surgical Sciences, Biomedical Imaging and Bioengineering [SBIB] IRG:** There is shared interest in acute lung injury. Surgical approaches to lung diseases could be assigned to the SBIB IRG. The SBIB IRG could consider sepsis, trauma, and multi-system organ dysfunction in which lung injury is incidental. The responses of the respiratory system to trauma, surgery, or other physiologic stress could be assigned to LIRR.

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Respiratory Integrative Biology and Translational Research [RIBT]

[\[RIBT Roster\]](#)

The Respiratory Integrative Biology and Translational Research [RIBT] Study Section reviews grant applications that deal with integrative aspects of the respiratory system and clinical studies. Thus, the fundamental emphasis of this study section concerns the integration of knowledge gained from investigations at the cellular and molecular level to higher levels of biological organization, including physiological genomics and translation into clinical application. Studies appropriate for review may involve research utilizing molecular and cellular methods, normal and genetically modified animal models, human subjects and mathematical modeling. Central areas of study are: 1) respiratory control processes; 2) integrated respiratory responses; 3) respiratory biophysics, biomechanics and transport; 4) translational and clinical studies, including physiological genomics; and 5) studies of normal and abnormal pulmonary vascular physiology (including endothelial and vascular smooth muscle cell biology) will be reviewed by RIBT. In each area, investigations concerning the impact of development and aging, genetics and sex/gender differences are appropriate.

Specific areas covered by RIBT:

- Respiratory system control processes including:
 - Respiratory neurobiology and the control of breathing including topics such as sensory receptors, central neural processes, neuromuscular transmission, neuroplasticity, endocrine influences and respiratory control disorders and compensatory mechanisms (e.g. SIDS and hyperventilation disorders). Additional topics of interest include autonomic control of the airways and pulmonary circulation as well as respiratory sensation.
 - Studies on the development of respiratory control mechanisms, lung mechanics or gas exchange, and the development of neural control of pulmonary circulation.
- Integrated respiratory function, including:
 - Hypoxia (intermittent and sustained hypoxia, gene expression and cell signaling, altitude responses, hypoxic pulmonary vasoconstriction, hypertension and angiogenesis), respiratory responses to exercise, hypercapnia and acid/base disturbances.
 - Respiratory responses to environmental irritants and allergens, and cardio-respiratory interactions (control, mechanics and gas exchange)
 - Sleep/wakefulness and sleep disordered breathing, as it involves neural control of respiratory rhythm generation, upper airway control and mechanics, the diaphragm, and the pathophysiology and consequences of sleep disordered breathing.
- Biophysics, biomechanics and transport including:
 - Respiratory muscle function including: mechanical function of the respiratory muscles and the chest wall during health and disease.
 - Pulmonary gas exchange, regional distributions of perfusion and ventilation, and ventilation-perfusion relationships
 - Biomechanics and biophysics of lung cells, the lung, airways or chest wall, as well as particle deposition in the airways
- Pulmonary vascular biology and disease including:
 - Control of pulmonary circulation.
 - Pulmonary hypertension, pulmonary thrombo-embolic disease, veno-occlusive disease, vasculitides, and primary pulmonary hypertension of the newborn.
 - Normal and abnormal endothelial and vascular smooth muscle cell biology and mechanisms of vasoreactivity.
 - Pulmonary vascular injury caused by reactive oxygen and nitrogen species and by hypoxia.
 - Inflammation of the pulmonary vasculature.
 - Pulmonary edema and lung fluid balance caused primarily by pulmonary vascular injury.
 - Effects of blood components such as coagulation factors and complement
- Translational, genomic and clinical studies:
 - Genetics of respiratory diseases, including integrated physiological consequences of gene mapping, expression and function,

gene-phenotype and gene-environment interactions in humans and animal models.

- Human studies associated with mechanisms, consequences and prevention of disease, as well as therapeutic interventions, assessment of genetic/environmental risk factors including population genetic studies, and outcomes assessment. Interventions may include Phase 1, Phase 2 and single site Phase 3 clinical trials. Large multi-site clinical trials are not generally appropriate for review in this study section, nor would large scale, epidemiological studies. Relevant diseases include all forms of lung and airway disease (e.g. asthma, COPD, infectious diseases), neural diseases associated with respiratory control (e.g. SIDS, sleep disordered breathing, neuromuscular disease or injury with respiratory insufficiency), and other respiratory diseases.

RIBT has the following shared interests within the RES IRG:

- **With Lung Cellular, Molecular and Immunobiology [LCMI]:** Applications emphasizing genetic, molecular and cellular basis of normal lung biology and alterations induced by inflammatory and immune disorders would typically be assigned to LCMI. RIBT would be assigned applications emphasizing effector outcomes, integrated responses and mechanisms of integrated response.
- **With Lung Injury, Repair and Remodeling [LIRR]:** Applications focusing on mechanisms of lung injury and repair at multiple levels of biological organization would be assigned to LIRR. RIBT shares interests with respect to the scope of investigations (molecular through whole animal), but differs from LIRR with respect to the specific topics considered. For example, RIBT may be assigned applications focusing more on physiological processes (control, biomechanics and transport) and integrated responses to injury, as well as translational studies. LIRR would be assigned applications focusing more on detailed cellular and molecular mechanisms of injury. Studies involving lung injury, including those resulting in pulmonary edema or lung fluid imbalance, would be reviewed by LIRR if the primary focus is on non-vascular tissue or cells, while studies focusing on vascular tissue or cells would be more appropriate for RIBT. Included in this rubric would be studies involving coagulation factors and complement.
- **With Lung Cellular, Molecular and Immunobiology [LCMI] and Lung Injury, Repair and Remodeling [LIRR]:** RIBT has shared interest with both LCMI and LIRR in their consideration of lung development. The control and integrated aspects of lung development are most appropriate for consideration by RIBT. More cellular and molecular studies pertaining to lung immunology or inflammation (LCMI) or responses to lung injury (LIRR), when not primarily pulmonary vascular in nature, would be more appropriate for assignment to the other two study sections in the IRG. Development of respiratory control mechanisms, lung mechanics or gas exchange is appropriate for assignment to RIBT. Mediator/cytokine studies may also be assigned to the three study sections in the IRG based on their disease focus.

RIBT has the following shared interests outside the RES IRG:

- **With the Biological Chemistry and Macromolecular Biophysics [BCMB] IRG:** RIBT generally reviews application dealing with the biophysics of lung tissue, gasses and fluids whereas the BCMB IRG has a specific focus on the biophysics of macromolecules and interacting small molecules. Potential overlap would involve studies of macromolecules in cells of pulmonary origin. Applications dealing with the biophysics of internal cell structures should be referred to RIBT if the focus is on understanding a pulmonary issue, especially if the approach is at an integrated level (e.g., cytoskeletal structure and cell stiffness in airway smooth muscle). Studies that are focused on macromolecules in general without a specific link to a pulmonary issue and/or without a focus on integration should be referred to the BCMB IRG. In general, studies of respiratory system structure and function that use primarily biophysical techniques (e.g., X-ray diffraction, electron spin resonance, and single molecular techniques) could also be assigned to the BCMB IRG.
- **With the Cell Biology [CB] IRG:** RIBT generally reviews applications dealing with integrated respiratory function whereas the CB IRG has a specific focus on the molecular understanding of cell structure and function. Potential overlap in this area would involve studies of pulmonary, respiratory neural or muscle cell structure and function. Applications focused on integrative aspects of respiratory cell structure and function (e.g., cytoskeletal structure and cell stiffness in airway smooth muscle) could be assigned to RIBT whereas studies using a pulmonary cell type to uncover more general aspects of molecular and cellular structure and function should be referred to the CB IRG. RIBT also reviews applications dealing with pulmonary vascular biology and disease, and there may be overlap with the CB IRG with cell structure and function in this area. In general, such studies in which the respiratory system is the primary focus are to be assigned to RIBT, while studies with a more basic focus could be assigned to the CB IRG.
- **With the Genes, Genomes & Genetics [GGG] IRG:** There is shared interest in fundamental genetics, including gene identification (mapping), functional genomics, genetics of basic function and complex diseases, population genetics and genetic epidemiology and the regulation of gene expression. In general RIBT could be assigned applications focusing on gene identification, mapping and function specific to the respiratory system, including the pulmonary vasculature. Studies of quantitative genetics, genetic epidemiology and genetic analysis of complex traits, and genetically engineered animals with an emphasis on genetics rather than mechanisms of respiratory function could be assigned to the GGG IRG. Studies of gene expression in respiratory neurons, and vascular endothelia and smooth muscle may be appropriately assigned to RIBT. Other studies on gene expression in which the respiratory system is not the principal focus could be assigned to the GGG IRG.
- **With the Biology of Development and Aging [BDA] IRG:** Studies on development and aging where the primary focus is on basic and clinical investigations of the respiratory system, as well as interactions between the pulmonary and cardiovascular systems could be assigned to RIBT. Applications that focus on fundamental and early development events (such as fundamental studies of cell cycle control, apoptosis, cell fate, or early primordial pattern formation) would be assigned to the BDA IRG. In general, when the question being addressed is germane to the development of more than a single organ system, either because it addresses the "primordial organ" or because of the generality of the process being studied, the application would also be assigned to the BDA IRG. Studies in which the focus is on aging and where the respiratory system is a secondary or minor component could be assigned to the BDA IRG.
- **With the Bioengineering Sciences and Technologies [BST] IRG:** Applications that focus on fundamental aspects of bioengineering and technology development would be assigned to the BST IRG, especially in early stages before practical uses are proven. Such topics might include drug delivery, imaging, and mathematical modeling or device development. Studies on these same topics that are specific to respiratory system structure and function could also be assigned to RIBT.
- **With the Health of the Population [HOP] IRG:** Large-scale clinical applications in which the primary outcomes are population studies related

to demographics or epidemiology may generally be assigned to the HOP IRG. Applications on the diseases, disorders, or functional consequences of behaviors associated with the respiratory system could be assigned to RIBT.

- **With the Risk, Prevention, and Health Behavior [RPHB] IRG:** Studies of behavior modification directed toward the prevention of pulmonary diseases could be assigned to the RPHB IRG. Applications involving limited behavioral interventions as just one component of a more comprehensive project relating to pulmonary diseases could be assigned to RIBT.
- **With the Immunology [IMM] IRG:** The IMM IRG may be assigned applications concerning the etiology and pathogenesis of organ specific and systemic immune diseases. RIBT may be assigned applications specifically focused on functional respiratory responses during immune diseases and specific factors or structures relevant to respiratory function, or that are focused on immune responses involved with pulmonary vascular biology and diseases.
- **With the Infectious Diseases and Microbiology [IDM] IRG:** The IDM IRG considers applications ranging from basic to clinical studies focused on infectious diseases and microbes. RIBT could be assigned applications specifically focused on functional consequences of infections on the respiratory system.
- **With the Cardiovascular Sciences [CVS] IRG:** There is shared interest in vascular cell biology, including endothelial cells and vascular smooth muscle cells. Studies focusing on lung vascular biology could be addressed to RIBT. Other vascular studies in which the respiratory system is not the principal focus could be assigned to the CVS IRG. In general, the CVS IRG would be assigned applications ranging from basic through clinical studies focused on the heart and systemic vasculature, and on cardiovascular diseases and their treatment. RIBT could be assigned applications that focus on associated respiratory responses and cardio-respiratory interactions ranging from basic through clinical studies, including studies on the control of pulmonary blood flow.
- **With the Endocrinology, Metabolism, Nutrition and Reproductive Sciences [EMNR] IRG:** There is shared interest with areas related to the control and integrated aspects of fetal and neonatal pulmonary physiology and pathophysiology. (1) Applications that directly relate to pulmonary function (such as gas exchange, lung mechanics, pulmonary surfactant) could be assigned to the RIBT. Applications dealing with endocrine, metabolic, nutritional, or reproductive effects (pregnancy and fetal and neonatal well-being) on fetal and neonatal pulmonary physiology and pathophysiology could be assigned to the EMNR IRG. (2) There is shared interest with areas related to Sudden Infant Death Syndrome (SIDS) as it relates to neonatal issues. Applications that directly relate to pulmonary function in SIDS (upper airway and neural control of breathing issues, for instance) could be assigned to RIBT. Applications dealing with endocrine, metabolic, nutritional, or reproductive effects (pregnancy and neonatal well-being) as they relate to neonatal SIDS could be assigned to the EMNR IRG.
- **With the Musculoskeletal, Oral and Skin Sciences [MOSS] IRG:** Studies involving respiratory muscles aimed at examining basic aspects of muscle function (such as cell biology, adaptation, muscle fatigue, and the study of muscular dystrophies) may be assigned to the MOSS IRG. Applications focused upon the mechanical/ventilatory action of the respiratory muscles, including the ventilatory consequences of muscle disease, could be assigned to the RES IRG.
- **With the Surgical Sciences, Biomedical Imaging, and Bioengineering [SBIB] IRG:** Applications in a variety of broad areas that are at the interface between physical science or engineering and biomedical or clinical research would be assigned to the SBIB IRG. These might include topics such as development of molecular probes, computational science and sensing technologies. Studies on these same topics that are specific to respiratory system structure and function may be assigned to RIBT.
- **With Molecular, Cellular, and Developmental Neuroscience [MDCN] IRG:** The MDCN IRG reviews applications in a number of areas related to the structure and function of neuronal, glial, and other excitable cells, as well as the development of both the central and the peripheral nervous systems. Specific areas of potential overlap with RIBT are in the area of respiratory neurobiology. In general, when the application deals with fundamental neurobiological principles applied to the respiratory control system, referral to RIBT is appropriate. Specific overlap occurs in the areas of rhythm generation, neurotransmitters, and plasticity. Studies of respiratory rhythm generation, including developmental studies in this area, are most appropriately assigned to RIBT, but could also be assigned to the MDCN IRG when the major emphasis is on basic neural mechanisms of central pattern generators versus respiratory rhythm generation per se. Similarly, studies of neurotransmitters, when in the context of understanding the central control of breathing, are most appropriately assigned to RIBT, but could also be assigned to the MDCN IRG when the major emphasis is on the broader understanding of neurotransmitter function. Finally, studies on respiratory neural plasticity, such as in response to exposure to hypoxia, are most appropriately assigned to RIBT, but could also be assigned to the MDCN IRG when the major emphasis is on broader aspects of neural plasticity.
- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** The IFCN IRG reviews applications in a number of areas of integrative and regulatory behavioral neurosciences. Specific areas of potential overlap with RIBT are in the area of respiratory neurobiology. In general, when the application deals with fundamental neurobiological principles applied to the respiratory control system, referral to RIBT is appropriate. Specific overlap occurs in the areas of rhythm generation and sleep. Studies of respiratory rhythm generation are most appropriately assigned to RIBT, but could also be assigned to the IFCN IRG when the major emphasis is on basic neural mechanisms of central pattern generators versus respiratory rhythm generation per se. Similarly, basic neural mechanisms of sleep and circadian rhythms are most appropriate for the IFCN IRG, but studies concerning the neurobiological impact of sleep on breathing could be reviewed by RIBT. Thus, studies of respiratory control disorders are most appropriately reviewed by RIBT. Since the IFCN IRG includes autonomic regulation (but not the control of breathing), there may be shared interests in the control of airway and vascular smooth muscle, as well as cardio-respiratory interactions. Again, if the primary focus is on the respiratory system or interactions with the respiratory system, then assignment to RIBT is appropriate.
- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** The BDCN IRG considers research applications focused on disease and injury to the nervous system, including issues of neural substrate and functional consequences, and rehabilitation. There may be shared interests in the consideration of respiratory function in neurodegenerative diseases such as parkinsonism, ALS, Rett Syndrome and a number of other neural disorders that affect breathing. When the primary focus of the application is on the respiratory system, then assignment to RIBT is appropriate. Assignment to the BDCN IRG is appropriate when the application considers the respiratory system as but one of the many systems affected by the neurodegenerative disease. Other neural disorders such as SIDS appear to be relatively specific to the respiratory system and are appropriate for consideration by RIBT.

[\[SBIR/STTR Study Section Rosters\]](#)

Specific areas covered by the RES Small Business SEP:

The Respiratory Sciences Small Business Activities Special Emphasis Panel [RES Small Business SEP] will review SBIR and STTR applications on diagnostics, devices and therapies focused on the entire pulmonary system and related organs and processes and using approaches ranging from basic research through clinical studies. This would include studies on the chest wall, upper and lower airways, parenchyma, pleural surfaces, and cells affected by and operative in these processes, including neural and endocrine control processes. Investigators may employ a range of approaches that include genetics, genomics and proteomics, molecular, cell, and computational biology, biochemistry, biophysics and bioengineering, imaging, analyses of model organisms, and human studies.

The RES Small Business SEP has the following shared interests outside the RES IRG:

- **With the Biology of Development and Aging [BDA] IRG:** Applications focused on stem cells or gene transfer therapies related to the respiratory system and its disorders are relevant to the RES Small Business SEP. Similarly, applications that focus on stem cells in early developmental contexts would be assigned to the BDA IRG. Applications that use human embryonic stem cells might also be clustered in the BDA IRG, even if studying respiratory system-specific issues.
- **With the Bioengineering Sciences and Technologies [BST] IRG:** (1) Studies that use the respiratory system as a platform for gene or drug delivery for non-pulmonary diseases may be assigned to the BST IRG. Application of gene or drug delivery technologies when it is specific for inherited and acquired lung disorders may be more appropriate for the RES Small Business SEP. Development of novel gene and drug delivery technologies may also be assigned to the BST IRG. (2) Applications that focus on fundamental aspects of bioengineering and technology development would be assigned to the BST IRG, especially in early stages before practical uses are proven. Such topics might include imaging, mathematical modeling, device development, or biomaterials and biointerfaces. Where tissue integration or application of specific biological or medical devices to the respiratory system is primary foci, assignment to the RES Small Business SEP may be appropriate.
- **With the Risk, Prevention, and Health Behavior [RPHB] IRG and the Health of the Population [HOP] IRG:** Studies of behavior modification, including health education or training, directed toward the prevention and treatment of respiratory diseases, including psychological aspects, could be assigned to the RPHB IRG or to the HOP IRG, depending upon the level of analysis and the nature of the intervention. Applications focused on respiratory diseases, disorders, or functional consequences of behaviors related to the respiratory system could be assigned to the RES Small Business SEP. Health education or training directed to the respiratory system health care provider, not the patient, should also be assigned to the RES Small Business SEP.
- **With the Oncological Sciences [ONC] IRG:** Studies of diagnosis, prevention, and treatment of lung cancer would be assigned to the ONC IRG. Applications focusing on dysplasia and hyperplasia derived from environmental or occupational lung exposure should be considered by the RES Small Business SEP.
- **With the Surgical Sciences, Biomedical Imaging, and Bioengineering [SBIB] IRG:**(1) Applications for which the emphasis is on the design or development of medical imaging systems, their components, or software would be referred to the SBIB IRG; where the emphasis is on obtaining structural, functional, or behavioral information the application would be referred to the RES Small Business SEP. (2) Applications having a bioengineering or device development focus could be referred to the SBIB IRG or to the RES Small Business SEP depending on the focus of the application. In general, if the device relates to multiple organs, the application would be referred to the SBIB IRG. Proposals on bioengineering related specifically to devices for respiratory system diseases and their use in respiratory system injury and repair are appropriate for the RES Small Business SEP.

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